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10/586,050	07/14/2006	Manabu Amikura	3308.2R.337	2437

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EXAMINER

FORD, NATHAN K

ART UNIT

PAPER NUMBER

1792

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/586,050

**Applicant(s)**

AMIKURA, MANABU

**Examiner**

NATHAN K. FORD

**Art Unit**

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12/20/2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) \_\_\_\_\_ is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/55/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Applicant's Response*

Acknowledged is the applicant's response, received December 20, 2007. Claims 1, 3-4, and 6 are amended. Claims 7-12 are new.

Regarding the first office action, the applicant contends the following:

- i. Since the entirety of Kuwada's upper portion sidewall is inserted into a large through-hole, the reference does not anticipate current claims 1 and 6, which require a projection to be inserted into the head mounting frame.
- ii. Metzner does not properly teach a showerhead main body with a sidewall projection.

The applicant's contentions are addressed as follows:

- i. As described below, Kuwada teaches a showerhead (82) inserted within a through-hole of a head mounting frame (108). As such, the reference meets the claimed limitations.
- ii. Metzner teaches an arrangement wherein a showerhead is inserted at multiple sites into the body of a head mounting frame. The disclosure of Metzner evidences that alternative showerhead-mounting frame connectivities are well-known in the art, and that adopting this specific connectivity within the apparatus of Kuwada would not only achieve the predictable result of securing the showerhead to the mounting frame but also effect greater heat transfer.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 5-6, 9, and 11-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Kuwada et al., US 2002/0029748.

Claims 1, 5-6, 11: Kuwada teaches a showerhead disposed within a process chamber comprising the following:

- A showerhead with a cup-shaped main body (82) disposed within the ceiling of a cylindrical vessel (22) [0021, 0049];

Art Unit: 1792

- A mount table (28) within the vessel (22);
- A plurality of holes (94) in the showerhead bottom wall;
- A showerhead sidewall (98);
  - Figure 2 delineates the showerhead sidewall as having steps which compose a projection (104);
- Two ceiling parts function as head mounting frame (108 and 84, collectively);
  - Wherein a through-hole (delimited by elements 112, 106a, 106b, 87) accommodates the projection (104);
  - Wherein portions (82, 98, 118) of the showerhead sidewall are not inserted into the
- A cooling mechanism comprising the structures contiguous to and including the medium channel (116) [0056];
  - Wherein the mechanism includes a Peltier element (112) mounted on an upper end of the projection (104) (Fig. 2);
  - Wherein the cooling jacket is the undesignated structure surrounding the channel (116);
  - Wherein the mechanism is exposed to an exterior of the vessel;
  - Wherein the mechanism is attached to an upper end portion of the projection (104);
- Figure 10 delineates screw bolts extending through the showerhead and connecting to the head mounting frame [0011].
- A diffusion plate (122) is disposed within the showerhead body and joined to the head mounting frame via said showerhead body [0058].

Claim 6 differs from claim 1 only in its recitation of the showerhead's "attachment," rather than "insertion," to the mounting frame such that the showerhead projection is exposed to an exterior of the processing vessel. Kuwada delineates such an embodiment in Figure 1 - the upper right corner of the projection (104) is clearly exposed to an exterior of the processing vessel.

Claims 9, 12: Either or both elements 106a and 87 fit the description of a ring-shaped flange element adjacent to the central through-hole and defining a central, circular head fixing opening (84).

#### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1792

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuwada in view of Hytros et al., US 2003/0132319.

Kuwada teaches neither the hinge fixing of the head-mounting frame to the chamber wall nor the capacity to remove the frame from the wall. Hytros teaches a showerhead assembly within a process chamber wherein the ceiling lid (144) is coupled to the chamber walls (106) via a hinge; the hinge allows the lid to be opened, thereby exposing the interior of the chamber body ([0028]). Given that the connecting piece is a hinge, the lid can most certainly be removed from the chamber. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to affix Kuwada's mounting frame to the chamber wall with a hinge as disclosed by Hytros to expose the interior of the chamber body.

Claims 3 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuwada et al., US 2002/0029748, in view of Metzner et al., US 2002/0192370.

Kuwada does not teach a plurality of through-holes formed in the head-mounting frame. Metzner, disclosing a deposition reactor, teaches a showerhead (240) inserted into multiple through-holes via fasteners (242) formed in a head-mounting frame (205); the fasteners, and thus the through-holes, are arranged at annular intervals in a circumferential direction (Figs. 4-5; [0054]). Metzner conceived the said fastener arrangement to increase contact between the head-mounting frame and the showerhead, which in turn begets greater heat transfer. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made for Kuwada to adopt the connectivity between the showerhead and head-mounting frame disclosed by Metzner to beget greater heat transfer. Regarding the plurality of through-holes and projections: It has been held that mere duplication of the essential working parts of a device involves only routine skill in the art (*St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8).

Claims 4 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuwada et al., US 2002/0029748, in view of Fujikawa et al., US 5,595,606.

Kuwada teaches one diffusion plate disposed within the head body to disperse the gas toward the wafer surface; he does not teach a plurality of plates ([0012]). Fujikawa teaches an embodiment wherein a plurality of diffusion

Art Unit: 1792

plates (14) is stacked in layers within the showerhead body (Fig. 15). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add one diffusion plate to the head body of Kuwada as taught by Fujikawa to further enhance the dispersion of gas toward the wafer surface.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan K. Ford whose telephone number is 571-270-1880. The examiner can normally be reached on M-F, 8:30-5:00 EDT. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland, can be reached at 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/N. K. F./

Examiner, Art Unit 1792

/Michael Cleveland/

Supervisory Patent Examiner, Art Unit 1792